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RAW SEQUENCE LISTING      DATE: 10/05/2001
PATENT APPLICATION: US/09/890,229    TIME: 11:05:12

Input Set : A:\PTO_mh.txt
Output Set: N:\CRF3\10052001\I890229.raw

```
 5 <110> APPLICANT: Bramley, Peter Michael
 6        Harker, Mark
 8 <120> TITLE OF INVENTION: Manipulating Isoprenoid Expression
10 <130> FILE REFERENCE: B0192/7031
12 <140> CURRENT APPLICATION NUMBER: US/09/890,229
13 <141> CURRENT FILING DATE: 2001-07-27
15 <150> PRIOR APPLICATION NUMBER: GB 9901902.8
16 <151> PRIOR FILING DATE: 1999-01-28
18 <160> NUMBER OF SEQ ID NOS: 12
20 <170> SOFTWARE: PatentIn version 3.0
22 <210> SEQ ID NO: 1
23 <211> LENGTH: 640
24 <212> TYPE: PRT
25 <213> ORGANISM: Synechocystis sp.
27 <400> SEQUENCE: 1
29 Met His Ile Ser Glu Leu Thr His Pro Asn Glu Leu Lys Gly Leu Ser
30 1               5                  10                  15
32 Ile Arg Glu Leu Glu Glu Val Ser Arg Gln Ile Arg Glu Lys His Leu
33               20                  25                  30
35 Gln Thr Val Ala Thr Ser Gly Gly His Leu Gly Pro Gly Leu Gly Val
36               35                  40                  45
38 Val Glu Leu Thr Val Ala Leu Tyr Ser Thr Leu Asp Leu Asp Lys Asp
39         50                  55                  60
41 Arg Val Ile Trp Asp Val Gly His Gln Ala Tyr Pro His Lys Met Leu
42 65                  70                  75                  80
44 Thr Gly Arg Tyr His Asp Phe His Thr Leu Arg Gln Lys Asp Gly Val
45               85                  90                  95
47 Ala Gly Tyr Leu Lys Arg Ser Glu Ser Arg Phe Asp His Phe Gly Ala
48               100                 105                 110
50 Gly His Ala Ser Thr Ser Ile Ser Ala Gly Leu Gly Met Ala Leu Ala
51               115                 120                 125
53 Arg Asp Ala Lys Gly Glu Asp Phe Lys Val Val Ser Ile Ile Gly Asp
54         130                 135                 140
56 Gly Ala Leu Thr Gly Gly Met Ala Leu Glu Ala Ile Asn His Ala Gly
57 145                 150                 155                 160
59 His Leu Pro His Thr Arg Leu Met Val Ile Leu Asn Asp Asn Glu Met
60               165                 170                 175
62 Ser Ile Ser Pro Asn Val Gly Ala Ile Ser Arg Tyr Leu Asn Lys Val
63               180                 185                 190
65 Arg Leu Ser Ser Pro Met Gln Phe Leu Thr Asp Asn Leu Glu Glu Gln
66               195                 200                 205
68 Ile Lys His Leu Pro Phe Val Gly Asp Ser Leu Thr Pro Glu Met Glu
69         210                 215                 220
71 Arg Val Lys Glu Gly Met Lys Arg Leu Val Val Pro Lys Val Gly Ala
72 225                 230                 235                 240
74 Val Ile Glu Glu Leu Gly Phe Lys Tyr Phe Gly Pro Ile Asp Gly His
75               245                 250                 255
```

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PATENT APPLICATION:  US/09/890,229      TIME: 11:05:12

Input Set : A:\PTO_mh.txt
Output Set: N:\CRF3\10052001\I890229.raw

```
77  Ser Leu Gln Glu Leu Ile Asp Thr Phe Lys Gln Ala Glu Lys Val Pro
78            260             265             270
80  Gly Pro Val Phe Val His Val Ser Thr Thr Lys Gly Lys Gly Tyr Asp
81            275             280             285
83  Leu Ala Glu Lys Asp Gln Val Gly Tyr His Ala Gln Ser Pro Phe Asn
84        290             295             300
86  Leu Ser Thr Gly Lys Ala Tyr Pro Ser Ser Lys Pro Lys Pro Pro Ser
87  305             310             315                 320
89  Tyr Ser Lys Val Phe Ala His Thr Leu Thr Thr Leu Ala Lys Glu Asn
90            325             330             335
92  Pro Asn Ile Val Gly Ile Thr Ala Ala Met Ala Thr Gly Thr Gly Leu
93            340             345             350
95  Asp Lys Leu Gln Ala Lys Leu Pro Lys Gln Tyr Val Asp Val Gly Ile
96            355             360             365
98  Ala Glu Gln His Ala Val Thr Leu Ala Ala Gly Met Ala Cys Glu Gly
99        370             375             380
101 Ile Arg Pro Val Val Ala Ile Tyr Ser Thr Phe Leu Gln Arg Gly Tyr
102 385             390             395                 400
104 Asp Gln Ile Ile His Asp Val Cys Ile Gln Lys Leu Pro Val Phe Phe
105             405             410             415
107 Cys Leu Asp Arg Ala Gly Ile Val Gly Ala Asp Gly Pro Thr His Gln
108             420             425             430
110 Gly Met Tyr Asp Ile Ala Tyr Leu Arg Cys Ile Pro Asn Leu Val Leu
111         435             440             445
113 Met Ala Pro Lys Asp Glu Ala Glu Leu Gln Gln Met Leu Val Thr Gly
114     450             455             460
116 Val Asn Tyr Thr Gly Gly Ala Ile Ala Met Arg Tyr Pro Arg Gly Asn
117 465             470             475             480
119 Gly Ile Gly Val Pro Leu Met Glu Glu Gly Trp Glu Pro Leu Glu Ile
120             485             490             495
122 Gly Lys Ala Glu Ile Leu Arg Ser Gly Asp Asp Val Leu Leu Leu Gly
123         500             505             510
125 Tyr Gly Ser Met Val Tyr Pro Ala Leu Gln Thr Ala Glu Leu Leu His
126         515             520             525
128 Glu His Gly Ile Glu Ala Thr Val Val Asn Ala Arg Phe Val Lys Pro
129     530             535             540
131 Leu Asp Thr Glu Leu Ile Leu Pro Leu Ala Glu Arg Ile Gly Lys Val
132 545             550             555                 560
134 Val Thr Met Glu Glu Gly Cys Leu Met Gly Gly Phe Gly Ser Ala Val
135             565             570             575
137 Ala Glu Ala Leu Met Asp Asn Asn Val Leu Val Pro Leu Lys Arg Leu
138         580             585             590
140 Gly Val Pro Asp Ile Leu Val Asp His Ala Thr Pro Glu Gln Ser Thr
141         595             600             605
143 Val Asp Leu Gly Leu Thr Pro Ala Gln Met Ala Gln Asn Ile Met Ala
144     610             615             620
146 Ser Leu Phe Lys Thr Glu Thr Glu Ser Val Val Ala Pro Gly Val Ser
147 625             630             635                 640
150 <210> SEQ ID NO: 2
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RAW SEQUENCE LISTING                    DATE: 10/05/2001
PATENT APPLICATION:   US/09/890,229     TIME: 11:05:12

Input Set : A:\PTO_mh.txt
Output Set: N:\CRF3\10052001\I890229.raw

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151 <211> LENGTH: 633
152 <212> TYPE: PRT
153 <213> ORGANISM: Bacillus subtilis
155 <400> SEQUENCE: 2
157 Met Asp Leu Leu Ser Ile Gln Asp Pro Ser Phe Leu Lys Asn Met Ser
158 1               5                   10                  15
160 Ile Asp Glu Leu Glu Lys Leu Ser Asp Glu Ile Arg Gln Phe Leu Ile
161             20                  25                  30
163 Thr Ser Leu Ser Ala Ser Gly Gly His Ile Gly Pro Asn Leu Gly Val
164         35                  40                  45
166 Val Glu Leu Thr Val Ala Leu His Lys Glu Phe Asn Ser Pro Lys Asp
167     50                  55                  60
169 Lys Phe Leu Trp Asp Val Gly His Gln Ser Tyr Val His Lys Leu Leu
170 65                  70                  75                  80
172 Thr Gly Arg Gly Lys Glu Phe Ala Thr Leu Arg Gln Tyr Lys Gly Leu
173             85                  90                  95
175 Cys Gly Phe Pro Lys Arg Ser Glu Ser Glu His Asp Val Trp Glu Thr
176             100                 105                 110
178 Gly His Ser Ser Thr Ser Leu Ser Gly Ala Met Gly Met Ala Ala Ala
179         115                 120                 125
181 Arg Asp Ile Lys Gly Thr Asp Glu Tyr Ile Ile Pro Ile Ile Gly Asp
182     130                 135                 140
184 Gly Ala Leu Thr Gly Gly Met Ala Leu Glu Ala Leu Asn His Ile Gly
185 145                 150                 155                 160
187 Asp Glu Lys Lys Asp Met Ile Val Ile Leu Asn Asp Asn Glu Met Ser
188             165                 170                 175
190 Ile Ala Pro Asn Val Gly Ala Ile His Ser Met Leu Gly Arg Leu Arg
191         180                 185                 190
193 Thr Ala Gly Lys Tyr Gln Trp Val Lys Asp Glu Leu Glu Tyr Leu Phe
194         195                 200                 205
196 Lys Lys Ile Pro Ala Val Gly Gly Lys Leu Ala Ala Thr Ala Glu Arg
197     210                 215                 220
199 Val Lys Asp Ser Leu Lys Tyr Met Leu Val Ser Gly Met Phe Phe Glu
200 225                 230                 235                 240
202 Glu Leu Gly Phe Thr Tyr Leu Gly Pro Val Asp Gly His Ser Tyr His
203             245                 250                 255
205 Glu Leu Ile Glu Asn Leu Gln Tyr Ala Lys Lys Thr Lys Gly Pro Val
206         260                 265                 270
208 Leu Leu His Val Ile Thr Lys Lys Gly Lys Gly Tyr Lys Pro Ala Glu
209         275                 280                 285
211 Thr Asp Thr Ile Gly Thr Trp His Gly Thr Gly Pro Tyr Lys Ile Asn
212     290                 295                 300
214 Thr Gly Asp Phe Val Lys Pro Lys Ala Ala Pro Ser Trp Ser Gly
215 305                 310                 315                 320
217 Leu Val Ser Gly Thr Val Gln Arg Met Ala Arg Glu Asp Gly Arg Ile
218             325                 330                 335
220 Val Ala Ile Thr Pro Ala Met Pro Val Gly Ser Lys Leu Glu Gly Phe
221         340                 345                 350
223 Ala Lys Glu Phe Pro Asp Arg Met Phe Asp Val Gly Ile Ala Glu Gln
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RAW SEQUENCE LISTING                           DATE: 10/05/2001
PATENT APPLICATION:  US/09/890,229             TIME: 11:05:12

Input Set : A:\PTO_mh.txt
Output Set: N:\CRF3\10052001\I890229.raw

```
224         355                 360                 365
226 His Ala Ala Thr Met Ala Ala Ala Met Ala Met Gln Gly Met Lys Pro
227     370             375             380
229 Phe Leu Ala Ile Tyr Ser Thr Phe Leu Gln Arg Ala Tyr Asp Gln Val
230 385             390             395             400
232 Val His Asp Ile Cys Arg Gln Asn Ala Asn Val Phe Ile Gly Ile Asp
233         405             410             415
235 Arg Ala Gly Leu Val Gly Ala Asp Gly Glu Thr His Gln Gly Val Phe
236     420             425             430
238 Asp Ile Ala Phe Met Arg His Ile Pro Asn Met Val Leu Met Met Pro
239     435             440             445
241 Lys Asp Glu Asn Glu Gly Gln His Met Val His Thr Ala Leu Ser Tyr
242     450             455             460
244 Asp Glu Gly Pro Ile Ala Met Arg Phe Pro Arg Gly Asn Gly Leu Gly
245 465             470             475             480
247 Val Lys Met Asp Glu Gln Leu Lys Thr Ile Pro Ile Gly Thr Trp Glu
248         485             490             495
250 Val Leu Arg Pro Gly Asn Asp Ala Val Ile Leu Thr Phe Gly Thr Thr
251         500             505             510
253 Ile Glu Met Ala Ile Glu Ala Ala Glu Glu Leu Gln Lys Glu Gly Leu
254     515             520             525
256 Ser Val Arg Val Val Asn Ala Arg Phe Ile Lys Pro Ile Asp Glu Lys
257     530             535             540
259 Met Met Lys Ser Ile Leu Lys Glu Gly Leu Pro Ile Leu Thr Ile Glu
260 545             550             555             560
262 Glu Ala Val Leu Glu Gly Gly Phe Gly Ser Ser Ile Leu Glu Phe Ala
263         565             570             575
265 His Asp Gln Gly Glu Tyr His Thr Pro Ile Asp Arg Met Gly Ile Pro
266     580             585             590
268 Asp Arg Phe Ile Glu His Gly Ser Val Thr Ala Leu Leu Glu Glu Ile
269     595             600             605
271 Gly Leu Thr Lys Gln Gln Val Ala Asn Arg Ile Arg Leu Leu Met Pro
272     610             615             620
274 Pro Lys Thr His Lys Gly Ile Gly Ser
275 625             630
278 <210> SEQ ID NO: 3
279 <211> LENGTH: 620
280 <212> TYPE: PRT
281 <213> ORGANISM: Escherichia coli
283 <400> SEQUENCE: 3
285 Met Ser Phe Asp Ile Ala Lys Tyr Pro Thr Leu Ala Leu Val Asp Ser
286 1           5               10              15
288 Thr Gln Glu Leu Arg Leu Leu Pro Lys Glu Ser Leu Pro Lys Leu Cys
289         20              25              30
291 Asp Glu Leu Arg Arg Tyr Leu Leu Asp Ser Val Ser Arg Ser Ser Gly
292     35              40              45
294 His Phe Ala Ser Gly Leu Gly Thr Val Glu Leu Thr Val Ala Leu His
295     50              55              60
297 Tyr Val Tyr Asn Thr Pro Phe Asp Gln Leu Ile Trp Asp Val Gly His
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RAW SEQUENCE LISTING                     DATE: 10/05/2001
PATENT APPLICATION:  US/09/890,229       TIME: 11:05:12

Input Set : A:\PTO_mh.txt
Output Set: N:\CRF3\10052001\I890229.raw

```
298 65                    70              75                  80
300 Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Lys Ile Gly
301           85              90                  95
303 Thr Ile Arg Gln Lys Gly Gly Leu His Pro Phe Pro Trp Arg Gly Glu
304           100             105                 110
306 Ser Glu Tyr Asp Val Leu Ser Val Gly His Ser Ser Thr Ser Ile Ser
307           115             120                 125
309 Ala Gly Ile Gly Ile Ala Val Ala Ala Glu Lys Glu Gly Lys Asn Arg
310      130             135                 140
312 Arg Thr Val Cys Val Ile Gly Asp Gly Ala Ile Thr Ala Gly Met Ala
313 145             150                 155                 160
315 Phe Glu Ala Met Asn His Ala Gly Asp Ile Arg Pro Asp Met Leu Val
316           165             170                 175
318 Ile Leu Asn Asp Asn Glu Met Ser Ile Ser Glu Asn Val Gly Ala Leu
319           180             185                 190
321 Asn Asn His Leu Ala Gln Leu Leu Ser Gly Lys Leu Tyr Ser Ser Leu
322      195             200                 205
324 Arg Glu Gly Gly Lys Lys Val Phe Ser Gly Val Pro Pro Ile Lys Glu
325      210             215                 220
327 Leu Leu Lys Arg Thr Glu Glu His Ile Lys Gly Met Val Val Pro Gly
328 225             230                 235                 240
330 Thr Leu Phe Glu Glu Leu Gly Phe Asn Tyr Ile Gly Pro Val Asp Gly
331           245             250                 255
333 His Asp Val Leu Gly Leu Ile Thr Thr Leu Lys Asn Met Arg Asp Leu
334           260             265                 270
336 Lys Gly Pro Gln Phe Leu His Ile Met Thr Lys Lys Gly Arg Gly Tyr
337      275             280                 285
339 Glu Pro Ala Glu Lys Asp Pro Ile Thr Phe His Ala Val Pro Lys Phe
340      290             295                 300
342 Asp Pro Ser Ser Gly Cys Leu Pro Lys Ser Ser Gly Gly Leu Pro Ser
343 305             310                 315                 320
345 Tyr Ser Lys Ile Phe Gly Asp Trp Leu Cys Glu Thr Ala Ala Lys Asp
346           325             330                 335
348 Asn Lys Leu Met Ala Ile Thr Pro Ala Met Arg Glu Gly Ser Gly Met
349           340             345                 350
351 Val Glu Phe Ser Arg Lys Phe Pro Asp Arg Tyr Phe Asp Val Ala Ile
352           355             360                 365
354 Ala Glu Gln His Ala Val Thr Phe Ala Ala Gly Leu Ala Ile Gly Gly
355      370             375                 380
357 Tyr Lys Pro Ile Val Ala Ile Tyr Ser Thr Phe Leu Gln Arg Ala Tyr
358 385             390                 395                 400
360 Asp Gln Val Leu His Asp Val Ala Ile Gln Lys Leu Pro Val Leu Phe
361           405             410                 415
363 Ala Ile Asp Arg Ala Gly Ile Val Gly Ala Asp Gly Gln Thr His Gln
364           420             425                 430
366 Gly Ala Phe Asp Leu Ser Tyr Leu Arg Cys Ile Pro Glu Met Val Ile
367           435             440                 445
369 Met Thr Pro Ser Asp Glu Asn Glu Cys Arg Gln Met Leu Tyr Thr Gly
370      450             455                 460
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Use of n and / or Xaa has been detected in the
Sequence Listing. Review the Sequence Listing
to ensure a corresponding explanation is present
in the <220> to <223> fields of each sequence
using n or Xaa.

**VERIFICATION SUMMARY**                    DATE: 10/05/2001
PATENT APPLICATION:  US/09/890,229          TIME: 11:05:13

Input Set : A:\PTO_mh.txt
Output Set: N:\CRF3\10052001\I890229.raw

L:12 M:270 C: Current Application Number differs, Replaced Current Application Number
L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:531 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5
L:1070 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6
L:1072 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6